What is claimed is:

1. An embedded electroconductive layer comprising:

an opening part or a depressed part formed in an insulating film on a substrate;

a barrier layer covering said opening part or depressed part;

a metal growth promoting layer on said barrier layer; and

an electroconductive layer embedded in said opening part or said depressed part via said barrier layer and said metal growth promoting layer.

2. The embedded electroconductive layer according to claim 1, wherein said barrier layer is one member selected from the group consisting of an amorphous Ti-Si-N layer, WN_x layers, TaN_x layers, and an Al_2O_3 layer.

3. The embedded electroconductive layer according to claim 1 ~~or claim 2~~, wherein said metal growth promoting layer is a TiN layer containing oxygen at a lower concentration than said barrier layer.

4. The embedded electroconductive layer according to claim 1, wherein said embedded electroconductive layer is a Cu layer, an Al layer, or an Al alloy layer having Al as a main component thereof.

5. An embedded electroconductive layer comprising:

an opening part or a depressed part formed in an insulating layer on a substrate;

a ground layer containing oxygen at a high concentration in the lower part thereof and at a low concentration in the upper part thereof and covering the surface of said insulating film in said opening part or said depressed part; and

an electroconductive layer embedded in said opening part or said depressed part via said ground layer.

6. The embedded electroconductive layer according to claim 5, wherein said ground layer is a

TiN layer.

7. The embedded electroconductive layer according to any of claim 5, wherein said embedded electroconductive layer is a Cu layer, an Al layer, or an Al alloy layer having Al as a main component thereof.

8. A method for the formation of an embedded electroconductive layer, comprising steps of:

forming an opening part or a depressed part in an insulating layer;

forming a barrier layer for covering said opening part or said depressed part;

forming on said barrier layer a TiN layer containing oxygen at a lower concentration than said barrier layer;

depositing a Cu layer on said TiN layer by the use of a chemical vapor growth method and embedding said Cu layer in said opening part or said depressed part; and

removing the unwanted parts of said barrier layer, said TiN layer of a low oxygen concentration, and said Cu layer by chemical mechanical polishing.

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9. The method according to claim 8, wherein said barrier layer is an amorphous Ti-Si-N layer deposited by a sputtering method.

10. The method according to claim ~~9~~ 8, wherein said sputtering method is a collimation sputtering method or a long throw sputtering method interposing an interval of not less than 10 cm between a target and a substrate under treatment.

11. The method according to claim 8, wherein said barrier layer is a WN_x layer or an TaN_x layer.

12. The method according to claim 8, wherein said barrier layer is a TiN layer formed by depositing a TiN layer and then thermally treating said TiN layer in an ambience of nitrogen and provided at least with an oxidized surface.

13. The method according to claim 8, wherein

said barrier layer is an amorphous Ti-Si-N layer formed by depositing a TiN layer and then thermally treating said TiN layer in an ambience of SiH_4 gas.

14. The method according to claim 8, wherein said barrier layer is an Al_2O_3 layer formed by depositing an Al layer and then thermally treating said Al layer in an oxidizing ambience.

15. The method according to claim 8, wherein said TiN layer containing oxygen at a lower concentration than said barrier layer is deposited by a chemical vapor growth method.

16. The method according to claim 8, wherein said TiN layer containing oxygen at a lower concentration than said barrier layer is deposited by a collimation sputtering method or a long throw sputtering method interposing an interval of not less than 10 cm between a target and a substrate under treatment.

17. A method for the formation of an embedded electroconductive layer, comprising steps of:

forming an opening part or a depressed part in an insulating layer;

forming a ground layer for covering said opening part or said depressed part;

reducing the surface of said ground layer by exposing said ground layer to a reducing gas; and

growing an electroconductive layer by a vapor phase chemical growth method using a metallic precursor thereby embedding said electroconductive layer in said opening part or said depressed part via said ground layer.

18. The method according to claim 17, wherein said step of exposing said ground layer to said reducing gas is part of a step of elevating the temperature of said electroconductive layer to the temperature for starting the growth by chemical vapor phase growth.

19. The method according to claim 17, wherein said ground layer is wholly oxidized prior to said step of reducing said ground layer.

20. The method according to claim 17, wherein said reducing gas is dimethyl hydrazine.

21. The method according to claim 17, wherein said reducing gas is monomethyl hydrazine.

22. The method according to claim 17, wherein said reducing gas is a silane.

23. The method according to claim 17, wherein said precursor is a metal complex of Cu.

24. The method according to claim 17, wherein said precursor is a metal compound of Al.

25. The method according to claim 17, wherein said precursor is a mixture of a metal complex of Cu with a metal compound of Al.

26. A method for the formation of an embedded electroconductive layer comprising steps of:

forming an interlayer insulating layer for covering a lower interconnection layer having a first barrier layer as the uppermost layer;

forming an opening part in said interlayer insulating film on said lower interconnection layer;

forming a second barrier layer for covering said opening part;

etching said second barrier layer thereby removing the surface of said second barrier layer;

growing an electroconductive layer by a vapor phase chemical growth method using a metallic precursor thereby embedding said electroconductive layer in said opening part; and

forming a third barrier layer of an upper interconnection layer on said electroconductive layer.

27. The method according to claim 26, wherein the etching gas used on said second barrier layer is one member selected from the group consisting of ClF_3, NF_3, and BCl_3.

28. The method according to claim 26, wherein said precursor is a metal complex of Cu.

29. The method according to claim 26, wherein said precursor is a metal compound of Al

30. The method according to claim 26, wherein said precursor is a mixture of a metal complex of Cu with a metal compound of Al.

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